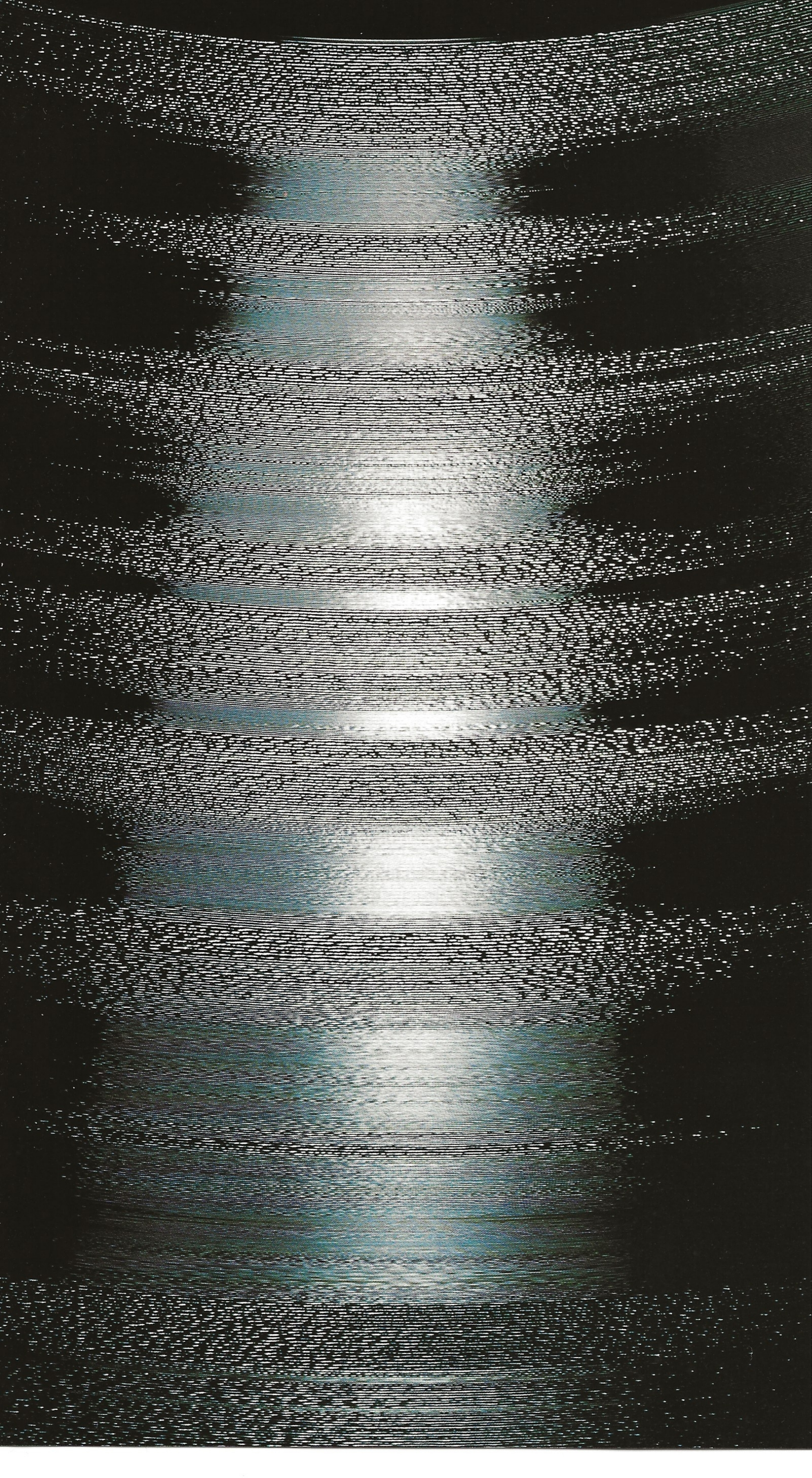
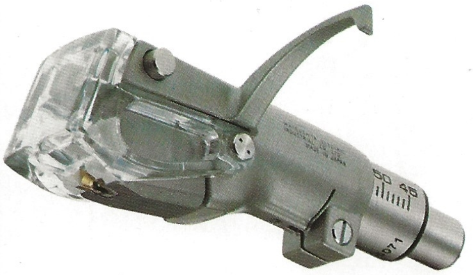
Technics

EPC-100CMK3

Moving Magnet Stereo Phono Cartridge

Why the World's Lowest Effective Moving Mass Gives You the Highest Degree of Musical Truthfulness





0.098 milligrams. And what it means for your music

Ruler-flat, wide frequency response extending up to and beyond the limits of human hearing is a chief demand made upon an ideal phono cartridge. But the high range resonance of a phono cartridge imposes a restriction upon its frequency response and causes increased crosstalk and harmonic distortion in the high range.

Poor tracking ability at high frequencies is also due to this high range resonance, because mechanical impedance greatly increases at the resonance point.

There is no way of completely eliminating high range resonance; but there is a way of moving it way beyond the audible range, up into the ultrasonic band where it can do no harm. And that way is to reduce the total effective moving mass of the stylus/cantilever assembly to the absolute minimum. Because effective moving mass is inversely proportional to high range resonance frequency.

By definition, the effective moving mass of a phono cartridge is the integrated moment of inertia around the supporting point of a vibrating system, divided by the square of the distance between the stylus tip and the suspension point. Reduction of mass near the tip contributes greatly to the reduction of effective moving mass. This means that cantilever material and shape play crucial roles in minimization of effective moving mass.

Enter the Technics Pure Boron Pipe Tapered Cantilever

The ideal cantilever must combine two characteristics that at first seem mutually exclusive.

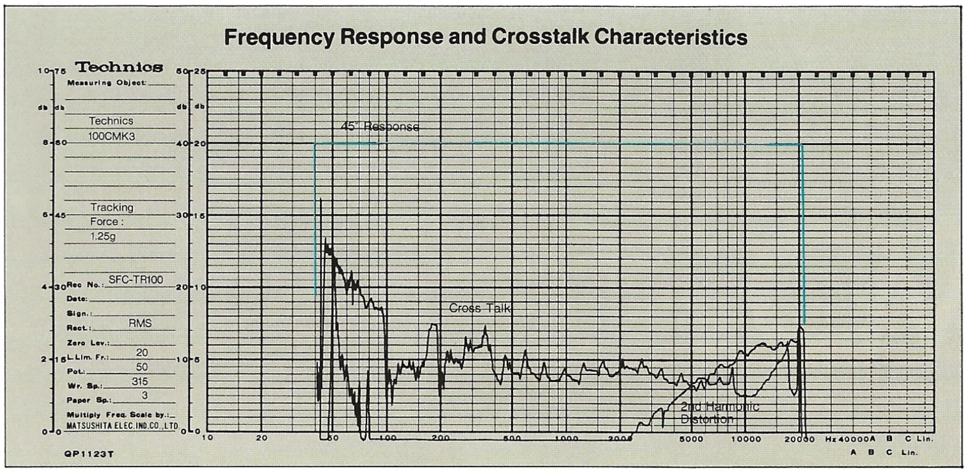
It must be extremely light, to reduce effective moving mass.

And it must be extremely hard and rigid so that it will transmit stylus vibrations as they are, without flexing, bending or otherwise falsifying these vibrations.

Many materials have been tried. Aluminum, beryllium, ruby, sapphire, titanium-nitride, even solid diamond. While each offers advantages in some area (such as lightness), it suffers from drawbacks in another (such as rigidity). Boron had long been known as possessing practically the ideal mix of physical characteristics. But boron is extremely difficult to machine into the needed shapes with the extremely narrow tolerances required.

Technics, with its vast technological resources, embarked upon, and finally succeeded in, creating a pure boron pipe cantilever. But for the ultimate mass reduction, a tapered pipe cantilever was even more preferable. The new EPC-100CMK3 has just that: a pure boron cantilever formed in a chemical vapor deposition (CVD) process, tubular and tapered towards the stylus tip. To insert the diamond stylus, a tiny opening is cut into the bottom side of the cantilever not by drilling but by laser beam.

So that now the EPC-100CMK3 possesses the world's smallest effective moving mass: 0.098 milligrams.



Frequency Response and Crosstalk Characteristics

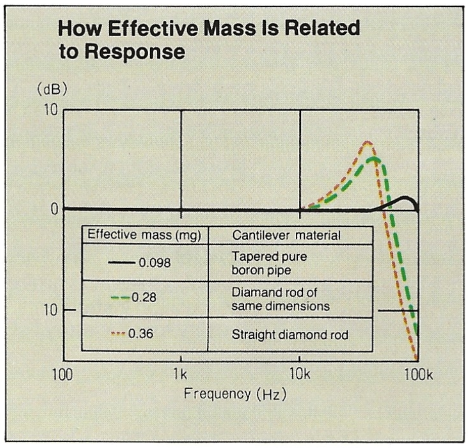
Your sonic benefits

With this extremely low effective moving mass, the high frequency resonance is moved up to the ultra-high frequency range, and an ultra-wide frequency response up to 100 kHz is obtained. Frequency response in the audio range remains ruler flat and devoid of uppermost octave dips or peaks. So much so that Technics guarantees 20 Hz to 15 kHz frequency response to be flat within ±0.3 dB, (15 Hz to 80 kHz response within ±3 dB), and each EPC-100CMK3 is supplied with its individual laboratory graph.

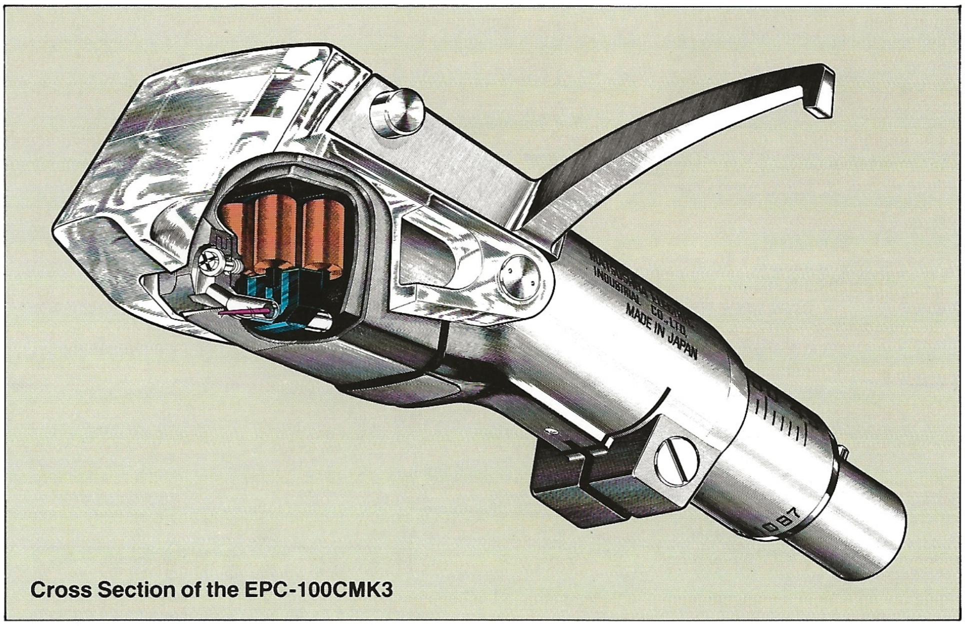
The entirely natural, effortless response up to and beyond the limits of hearing is, however, only part of the story. A resonance peak near 20 kHz as displayed by many conventional designs has other unwelcome side effects. Distortion rises and channel separation deteriorate in the high treble. With this resonance problem completely out of the way, distortion in the EPC-100CMK3 remains extremely low all the way to the top, and channel separation stays sharp and clear-cut. Not only the fundamentals, but also the complex overtone structures of musical instruments remain natural, unstrained, and clearly localized in space.

Extended flat response on the electro-magnetic circuit, too

To compensate for mechanical resonance peaks, others often escape into a deliberate error in the response of the electro-magnetic generating system; by introducing an artificial roll-off in the upper range, they try to achieve flat overall response. Not only does this approach never really work—some dips and peaks just cannot be ironed out this way—but it causes new problems with phase relationships. Having solved the mechanical resonance problem by its ultra-low effective moving mass, the Technics EPC-100CMK3 can and does provide equally flat, wide frequency response in its electro-magnetic circuit.



How Effective Mass Is Related to Response



Cross Section of the EPC-100CMK3

Mirror-finished "HPF" cores, yokes and pole pieces

Accurate dimensioning and positioning are the chief requirements for the magnetic circuit (the cores, yokes and pole pieces) to obtain flat, linear response. Technics uses "HPF" (hot pressed ferrite) material of minimum high frequency loss and polished to mirror-finish accuracy.

Flat response at any room temperature TTDD

Conventional butyl rubber dampers tend to harden at low temperatures, to soften as the mercury climbs. As the compliance of the damper is a vital factor in determining cartridge compliance, tracking ability and ultimately frequency response, such temperature dependent variations are undesirable. The Technics developed TTDD (Technics Temperature Defense Damper), on the other hand, maintains virtually the same viscoelasticity throughout the normal range of room temperatures (5 to 35°C), assuring consistently excellent tracking behavior, frequency response and sound quality.

Pinpoint imaging thanks to Technics One-Point Suspension

For clear, consistent channel separation, the magnet must vibrate in relation to a clearly defined, unvarying pivot point. Any shift in this reference point causes a momentary blurring of instrument images and localization. Technics uses a one-point suspension system designed to maintain an immovable pivot point regardless of operating conditions.

High-energy disc shaped samarium cobalt magnet

Although small and of low mass, this rare earth magnet possesses high magnetic energy to assure sufficient cartridge output voltage. The magnet's disc shape helps to further improve sound localization.

Other features

- Low impedance, low inductance design avoids changes in response due to load resistance/capacitance.
- World's lowest mass elliptical diamond stylus tip, mounted into (not through) cantilever. Nude diamond, structurally oriented and polished to narrow tolerances.
- Integrated magnesium alloy headshell. Damped to avoid resonances. Integrated stylus guard self-retracts when two lock buttons are pushed.
- Convenient, calibrated overhang adjustment.
- Stylus assembly secured by fastenging screw.

Technical Specifications

Type	Moving magnet stereo cartridge of one-point suspension with disc-shaped magnet
Cantilever	Pure boron tapered pipe cantilever
Magnetic circuit	All "HPF" core precision polished
Damper	TTDD (Technics Temperature Defense Damper)
Magnet	Samarium cobalt (Sm-Co) (BH) max=30 MG·Oe
Frequency response	5~100,000 Hz 15~80,000 Hz ±3 dB 20~15,000 Hz ±0.3 dB
Temperature characteristics (5°C~35°C)	±1 dB, 10 kHz ±3 dB, 20 kHz (standard 0 dB at 1 kHz/20°C)
Output voltage	1.2 mV 1 kHz, 5 cm/sec zero to peak, lateral velocity (3.4 mV 1 kHz, 10 cm/sec zero to peak, 45° velocity DIN 45 500)
Channel separation	More than 25 dB, 1 kHz More than 20 dB, 10 kHz
Channel balance	Within 0.5 dB, 1 kHz
Compliance	12×10^{-6} cm/dyne, 100 Hz
DC resistance	30 ohms
Inductance	33 mH
Impedance	210 ohms, 1 kHz
Recommended load impedance	10 kΩ~1 MΩ
Recommended load capacitance	Less than 500 pF
Stylus tip	0.2×0.7 mil (5×18 µm) elliptical, block diamond 0.07 mm square
Effective moving mass	0.098 mg
Tracking force	1.25±0.25 g
Headshell construction	Integrated headshell and cartridge
Overhang adjustment range	Distance from stylus tip to tonearm attachment point 52±3 mm
Cartridge lateral angle adjustment range	Right-left ±2°
Stylus guard	Automatic retraction, with locking buttons
Weight	18.3 g (including headshell and stylus guard)
Stylus replacement method	Screw type
Replacement stylus	EPS-100ED3

SFC-TR100 Audio Test Record supplied

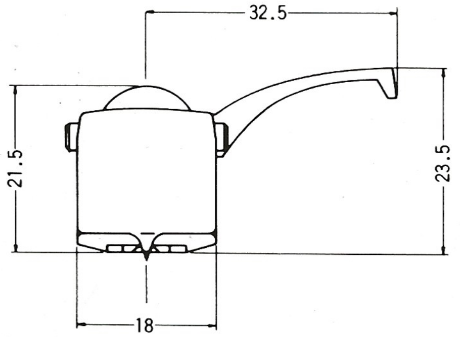
Every EPC-100CMK3 comes with its individual laboratory graph and a Technics Audio Test Record especially produced to permit meaningful auditory response tests as well as evaluation by music.

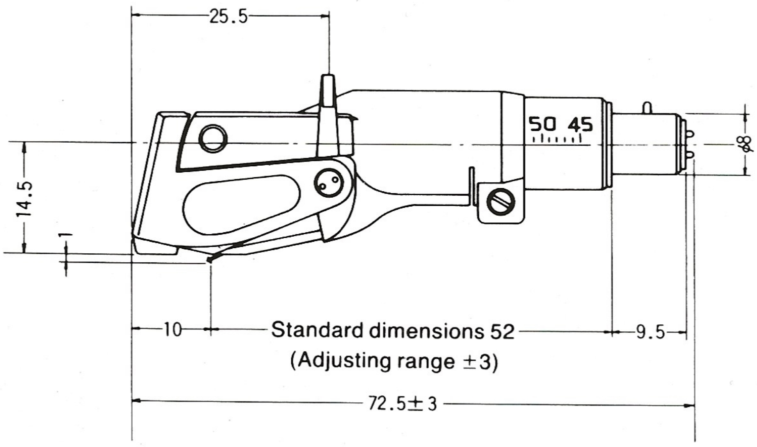
Side A

1 kHz reference signal; 40 Hz to 20 kHz sweep for frequency response measurements; spot frequencies; tracking ability test bands at 1 kHz and 100 Hz, lateral cutting levels with sweep up to 100 µm, vertical up to 50 µm amplitude; white noise band; low frequency sweep for arm resonance checks.

Side B

Bach's Chaconne arranged for various combinations of string, wind and percussion instruments. From 76 cm/sec master tape. Natural sonic quality for revelatory listening tests.





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